Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun;

a scan coil for freely swinging an electron probe, formed via said magnetic superposition lens, on a surface of said target for X-ray generation;

reflected electron detecting means having a detecting portion disposed above said target for X-ray generation scanned by the ~~above~~ electron probe, for detecting a reflected electron from said target; and

electron image generating means for performing imaging of a target surface utilizing signals from said reflected electron detecting means, wherein the apparatus is provided for allowing ~~that~~ alignment operations including focus adjustment to said target for X-ray generation and astigmatism correction to be performed on the basis of image information from the electron image.

2. (currently amended) An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam, from an electron source having an electron generating portion and an anode, to impinge on a target and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens wherein ~~having~~ a magnetic field generating portion is disposed in the vicinity of the ~~an~~ electron generating portion of said ~~an~~ electron source ~~gun~~, so that a magnetic field is superposed with an electric field formed by said electron source at least from the electron generating portion to the anode as a component element of electron accelerating means, so as to produce from said electron source a focused electron beam with reduced electron beam loss amount by focusing

the electrons while accelerating the electrons by said anode just after generating them from the electron generating portion; and

a scan coil for freely swinging an electron probe formed via said magnetic superposition lens on a surface of said target for X-ray generation.

3. (currently amended) An X-ray microscopic inspection apparatus having-X-ray generating means for generating X-rays by allowing an electron beam, from an electron source having an electron generating portion and an anode, to impinge on a target for X-ray generation and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens wherein ~~having~~ a magnetic field generating portion is disposed in the vicinity of the ~~an~~ electron generating portion of said ~~an~~ electron source ~~gun~~, so that a magnetic field is superposed with an electric field formed by said electron source at least from the electron generating portion to the anode as a component element of electron accelerating means, so as to produce from said electron source a focused electron beam with reduced electron beam loss amount by focusing the electrons while accelerating the electrons by said anode just after generating them from the electron generating portion;

an electron beam axis alignment coil disposed in the vicinity of the electron generating portion of said electron source, for aligning an axis of an electron beam allowed to impinge on said target for X-ray generation via said magnetic superposition lens while accelerating the electron.

4. (currently amended) An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam, from an electron source having an electron generating portion and an anode, to impinge on a target and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens wherein ~~having~~ a magnetic field generating portion is disposed in the vicinity of the ~~an~~ electron generating portion of said ~~an~~ electron source ~~gun~~, so that a magnetic field is superposed with an electric field formed by said electron source at least from the electron generating portion to the anode as a

component element of electron accelerating means, so as to produce from said electron source a focused electron beam with reduced electron beam loss amount by focusing the electrons while accelerating the electrons by said anode just after generating them from the electron generating portion;

electron probe control means for scanning an electron beam; and

X-ray CT image generating means for allowing a microstructure of a cross section of interest of said object to be displayed by processing plural sets of images based on data of transmitted X-rays of said object in response to said scanning.

5. (currently amended) An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam, from an electron source having an electron generating portion and an anode, to impinge on a target for X-ray generation and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens wherein ~~having~~ a magnetic field generating portion is disposed in the vicinity of the ~~an~~ electron generating portion of said ~~an~~ electron source ~~gun~~, so that a magnetic field is superposed with an electric field formed by said electron source at least from the electron generating portion to the anode as a component element of electron accelerating means, so as to produce from said electron source a focused electron beam with reduced electron beam loss amount by focusing the electrons while accelerating the electrons by said anode just after generating them from the electron generating portion;

fluorescent X-ray detecting means having a detecting portion disposed above said object and outside an X-ray target for detecting a fluorescent X-ray generated from said object; and

elemental analysis means for analyzing elements of said object based on fluorescent X-ray signals from said fluorescent X-ray detecting means.

6. (currently amended) An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation and for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising:

a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; and

a scan coil for freely swinging an electron probe, formed via said magnetic superposition lens, on a surface of said target for X-ray generation;

wherein the target comprises a plurality of target elements formed by a CVD method or a sputtering method, the target elements being provided for generating different characteristic X-rays having different wavelengths,

wherein the apparatus is arranged so that characteristic X-rays of a wavelength of interest may be generated by swinging said electron probe to a target element appropriate for generating ~~X-ray s~~ X-rays having the wavelength of interest, depending on a purpose of inspection.

7. (new) The X-ray microscopic inspection apparatus of claim 2, wherein the electron generating portion is an electron gun having an ultra-high vacuum electron chamber, and wherein the magnetic field generating portion is disposed outside the ultra-high vacuum electron chamber.

8. (new) The X-ray microscopic inspection apparatus of claim 3 wherein the electron generating portion is an electron gun having an ultra-high vacuum electron chamber, and wherein the magnetic field generating portion is disposed outside the ultra-high vacuum electron chamber.

9. (new) The X-ray microscopic inspection apparatus of claim 4 wherein the electron generating portion is an electron gun having an ultra-high vacuum electron chamber, and wherein the magnetic field generating portion is disposed outside the ultra-high vacuum electron chamber.

10. (New) The X-ray microscopic inspection apparatus of claim 5 wherein the electron generating portion is an electron gun having an ultra-high vacuum electron chamber, and wherein the magnetic field generating portion is disposed outside the ultra-high vacuum electron chamber.